BELLCOMM, INC.
955 L'ENFANT PLAZA NORTH, S.W. WASHINGTON, D.C. 20024

B68 12063

SUBJECT: AAP Mission Requirements Panel Meeting - Case 610

DATE: December 19, 1968

FROM: K. E. Martersteck

ABSTRACT

Outstanding action items were reviewed at an "informal" meeting of the AAP Mission Requirements Panel on December 13, 1968 in preparation for the forthcoming AAP Configuration Review Meeting Attention was focused on the status and future updating of the Baseline Reference Mission Document, the CM/SM stowage problem, the status of plans to use MDA port 4 and a proposal to combine AAP-3A and AAP-3/AAP-4 into one mission.

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MEMORANDUM FOR FILE

An "informal" meeting of the AAP Mission Requirements Panel was held at MSC on December 13, 1968, primarily to discuss the status of panel action items which may become the subject of agenda items at the AAP Configuration Review Meeting currently scheduled for January 8, 1969. Major discussion points are summarized below.

1. Status of the Baseline Reference Mission Document

The final draft was reviewed by the intercenter steering committee and subsequently signed off by the MSC AAPO. Printed documents will be distributed by December 16. The BRMD is being prepared in loose-leaf form to facilitate entering revisions. It has not yet been decided how and when changes should be made, although the consensus was that the Panel should approve and/or direct changes when appropriate.

With respect to baseline changes, it was mentioned that MSFC would like the Cluster held in a solar inertial attitude during CMG spin-up so that more power would be available. It is not clear that the WACS has sufficient capability, so the SM RCS might be considered for this function. A group was appointed to review the attitude control timeline and determine which WACS control functions might be transferred to the SM RCS. It was noted that there is unbudgeted SM RCS capacity in the amount of about 200 lbs on AAP-1 and 600 lbs on AAP-3A and AAP-3, payload performance capability permitting. Potentially in competition for unused RCS capability, especially on AAP-1, is additional Cluster boosting. Use of the 200 lbs of propellant for boosting the Cluster would increase the AAP-2 payload by more than 700 lbs.

KSC requested more firm data on launch window usage for the AAP rendezvous missions. The Guidance, Performance and Dynamics Subpanel was assigned an action item to establish the launch windows for the various AAP launches and make the data available for an updating of the BRMD.

2. CM/SM Stowage Problem

R. Machell, MSC/KF, reported that current estimates indicate more than 1700 lbs of gear on AAP-3A and 1400 lbs on AAP-3 which cannot be carried in the CM without the 13,500 lb limit on parachute hung weight being exceeded. A limitation on stowage

volume undoubtedly exists also but this problem has not been seriously addressed yet. Three general categories of supplies cause the problem. First is food which could be carried somewhere on AAP-2. It is believed that stowage for the eight-month period would not have a deleterious effect on the condition of the food. The second major item is film. In most cases there is reluctance to contemplate storing film in orbit for long periods of time. Thus the only alternative appears to be to reduce the quantity of film which must be carried. It was suggested, for example, that on Experiment M055 (Time and Motion Study) perhaps the frame rate could be lowered thereby directly reducing the film requirement for this experiment. Finally there are replacement components for various OWS systems such as an MOL sieve, fans, pumps, etc. It was felt that, except for an AM tape recorder, all such items will probably have to be deleted from the stowage list. The possibility of using SM stowage was questioned. At present the SM has no such stowage capability because there is no access to empty spaces in the SM. Furthermore, because of funding limitations there is no effort underway either at North American Rockwell or at MSC to engineer SM stowage capability. Mr. Machell plans to set up a meeting with MSFC personnel to begin working the stowage problem jointly.

3. Flexible Airlock Study

The Martin Company is concluding a study for MSC of various implementations of a flexible airlock which would permit some degree of experiment pointing without necessitating the pointing of the entire Cluster. From the three concepts studied, a system of two-axis gimbals and bellows was selected as best. With a 16" bellows, this concept would provide a 25° half-cone angle field of view for all experiments except T027 which has a mirror system already built in. The mirror system was investigated also but was found to have applicability limited to only three experiments, primarily because energetic particles and very-short wavelength radiation are difficult to reflect. A joint MSC-MSFC presentation on the flexible airlock proposal will be available for the Configuration Meeting.

4. Status of MDA Port 4

In response to an action item, K. Turner, Headquarters/MLA, attempted to get a Headquarters clarification of the intended use for MDA port 4. Mr. Turner had a draft reply which indicated that plans should be made for the use of port 4 as a contingency docking port in the event of a failure at port 5. In addition, an engineering evaluation of having two CM/SM's docked simultaneously to the MDA was requested. The Panel felt that the use of port 4 as a backup would be extremely difficult. However, temporary use, such

as for crew exchange between CM/SM's, may be possible. A joint presentation on this general subject will be prepared for the Configuration Meeting as requested.

5. Combination AAP-3A/AAP-3/AAP-4 Mission

M. Jenkins, MSC/KM, discussed an effort underway at MSC to evaluate a mission which would combine the objectives of the AAP-3A and AAP-3/AAP-4 missions using the AAP-3/AAP-4 hardware. In Mr. Jenkins' proposal, the AAP-3A CM/SM could then rendezvous with the Cluster before the AAP-3 crew returns, thereby offering the possibility of one crewman spending over 100 days in orbit. Needless to say, this proposal stimulated considerable discussion, much of it surrounding the medical criteria for such a venture. Dr. B. Newsom, MSC/DA, stated that even if adequate real-time monitoring of the crew were possible, uncertainty of the ability of the crew to survive reentry would prevail. Some of the medical staff believe lower body negative pressure tests made on the crew in orbit (which requires the presence of a physician-astronaut) would provide sufficient data on which to determine the astronaut's ability to survive reentry. However, there is not unanimity in this opinion.

The Panel decided that before the merits of the proposal can be debated further, it must be determined whether it is feasible to satisfy both the AAP-3A and AAP-3/AAP-4 objectives on one mission, even with new groundrules on the crew participation required for the experiments. Therefore, an action item was accepted by MSC to work out a combined medical/ATM timeline for such a mission.

6. Performance Improvements

Suggested performance improvements were very briefly discussed. Among those mentioned were:

(1) J-2 engine selection for all S-IVB stages,

(2) delayed passivation for AAP-2,

(3) additional RCS boost of the OWS by AAP-1,

(4) baseline a less conservative estimate of the SPS insertion payload,

(5) select SPS engines,

(6) carry $2\sigma$ FPR reserves in the S-IVB.

No specific action was taken on any of these items but the Guidance, Performance and Dynamics Subpanel will be mindful of these possibilities as it works on launch performance for the AAP missions.

7. Backup Mission Study

It was announced that the MSC Medical Directorate has taken the position that "satisfactory completion" of a 28-day medical mission is required before a 28-day decoupled ATM mission may be flown. This eliminates about half of the contingency cases which could lead to a decoupled mission and thereby reduces its attractiveness somewhat. Also it appears that the cost increment to fly a decoupled mission may be higher than previously reported to the Panel. The committee working this action item will consider these new developments and prepare its presentation for the Configuration Meeting accordingly.

K. E. Martersteck

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